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THE TRICHOPTERA OF LOWER CALIFORNIA

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Considering the complete lack of organized information on the caddisflies of Lower California, the collections reported here are especially noteworthy. They are important also in view of the equally great void in our knowledge regarding the Trichoptera in western Mexico.

This report is based primarily on the 1938 collection of Dr. and Mrs. A. E. Michelbacher and Dr. E. S. Ross, and the 1941 collection of Dr. Ross and Dr. G. E. Bohart. For completeness, I have included five other species collected by Dr. H. J. Rayner.

Faunal Relationships

In this report, fourteen species of Trichoptera are recorded from the Peninsula, and at least four others are represented in the collections but are identified only to genus. An analysis of the fourteen identified species brings out some interesting relationships with the fauna of other parts of the Southwest.

Four species, *Chimarra utahensis, Oecetis inconspicua, O. disjuncta,* and *Helicopsyche borealis,* are widespread throughout either most of North America or the western montane area.

Four species are known from widely separated localities in the Southwest, extending from Oklahoma or Texas to Lower California. This group includes *Chimarra angustipennis* and *C. elia*, and *Marilia flexuosa* and *M. nobsca*. These four species appear to be part of a distinctive southwestern fauna which extends through most of Mexico.

The third group comprises two species, *Hydropsyche philo* and *Cheumatopsyche mickeli*, previously known only from western California. These two species belong to a small faunal element which seems to be restricted to the coastal mountains south of San Francisco. The Lower California peninsula is simply an extension of this general uplift. In view of this it is not surprising to find the same species at both ends of the chain.

Four of the species are known to date only from Lower California: *Rhyacophila rayneri, Chimarra laguna, Notiomyia sagittosa*, and *Lepidostoma rhino*. Each of the last three species is related to members of the southwestern fauna, whereas the first shows a relationship only with more northern Rocky Mountain and West Coast species. So little intensive collecting has been done through the southwestern United States and western Mexico that we have an extremely imperfect knowledge of the fauna of this entire area. It is therefore premature to suggest that any of these four species are relicts confined now to Lower California, rather it is to be expected that they will prove to belong to either the more widely distributed southwestern fauna, or to the more restricted coastal fauna.

It would be interesting if future collecting should show that some of these species, or others yet undiscovered, are actual relict species confined to this area. It is hoped that further investigation of this general region continues, in order to test some of these possibilities.

Family **RHYACOPHILIDAE**

To date only the genus *Rhyacophila* has been reported from Lower California, although the southwestern genera *Atopsyche* and *Protoptila* probably occur there also.

Rhyacophila rayneri Ross, new species

In many respects this species appears most closely related to *R. iranda* Ross but differs from it and its relatives in the elongate, tongue-like projection of the ninth tergite and other characteristics of the genitalia.

Male. Length from front of head to tip of folded wings, 12 mm. Color dark brown, appendages and venter lighter, wings a rich brown on which is superimposed an indefinite irrorate pattern of paler markings. General

structure typical for genus. Genitalia as in figure 1. Ninth segment narrow, the dorsum produced into a long narrow strap with which the tenth tergite articulates. Tenth tergite also long and narrow, the mesal processes narrow and upturned, resting against the end of the dorsal process; the lateral plates do not seem to be sclerotized. Clasper with basal segment only slightly longer than deep, rhomboidal; apical segment moderately long with a large rounded heel and a projecting rounded toe, both bearing a patch of dark spicules. In addition to the basal cylindrical sheath, the aedeagus,

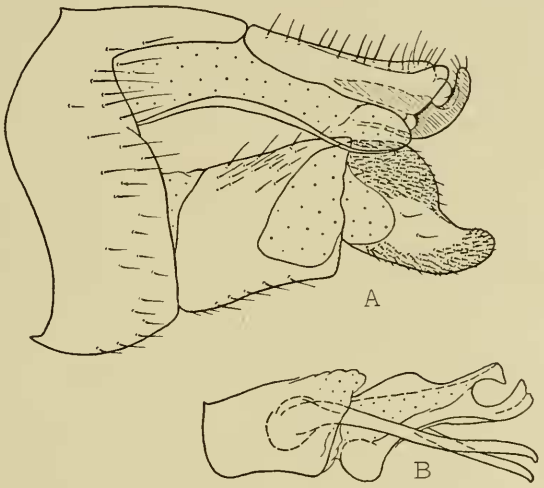

Fig. 1. *Rhyacophila rayneri,* new species; A, male genitalia, lateral aspect; *B,* aedeagus, lateral aspect.

figure 1B, consists of only a pair of sinuate, sclerotized, lateral arms and a central structure; this structure is apparently compound, consisting of a ventral part, bulbous at base, and a dorsal part which extends basad to the base of the lateral arms; from lateral view, this mesal structure looks something like an open mouth with the ventral part projecting upward and the dorsal part projecting slightly downward.

Holotype, male. **Valadares, Lower California, Mexico, Rio Santo Domingo,** about 1,000 feet elevation, May 24, 1937, H. J. Rayner. In the collection of the Illinois Natural History Survey.

Family **PHILOPOTAMIDAE**

Chimarra utahensis Ross

Chimarrha utahensis Ross, 1938, Ill. Nat. Hist. Surv. Bull., 21:134. Knowlton and Harmston, 1938, Ent. News, 49:285.

Chimarrha idahoensis Ling, 1938[1], Pan-Pacific Ent., 14:64.

Chimarrha utahensis Ross, 1944, Ill. Nat. Hist. Surv. Bull., 23:292.

Type locality: Gandy, Utah.

Recorded distribution: Gandy, Utah; Lewiston, Ida.[1]

New records: Lower California—Rio Santo Domingo, Rancho San Antonio, 1,000 feet elev., May 24, 1937, H. J. Rayner, 2♂♂. California—Santa Barbara, Feb., 1876, 1♂. South Dakota—Cascade Springs, July 30, 1935, H. C. Severin, 1♂. Utah—Hurricane, April 25, 1941, Knowlton and Hardy, 1♂; Zion National Park, at Weeping Rocks, Sept. 2, 1943, G. F. Knowlton, 4♂♂. Wyoming—Nez Perce Cr., Yellowstone National Park, Aug. 1, 1940, T. H. Frison and T. H. Frison, Jr., 1♂.

This is the only member of the genus in North America which has a range scattered through the western montane region.

Chimarra angustipennis Banks

Chimarrha angustipennis Banks, 1903, Proc. Ent. Soc. Wash., 5:242.
Chimarra angustipennis Banks. Ross, 1944[1], Ill. Nat. Hist. Surv. Bull., 23:51.

Type locality: Hot Springs, Ark.

Recorded distribution: Arkansas and Oklahoma.[1]

New records: Lower California—Big Cyn, Sierra Laguna, Oct. 13, 1941, Ross and Bohart, 1♂. Texas—Austin, 2♂♂; west of Palo Pinto, June 12, 1943, in small stream, T. H. Frison, 1♂. Mexico—Rancho La Golondrina, Rio Sabinas, Muzquiz Coahuila, June 24, 1938, Rollin H. Baker, 6♂♂, 3♀♀.

Chimarra elia Ross

Chimarra elia Ross, 1944, Ill. Nat. Hist. Surv. Bull., 23:269.

Type locality: Brackettville, Texas.

Recorded distribution: Brackettville, Texas.

New records: Lower California—Todos Santos, Nov. 10, 1941, Ross and Bohart, 25♂♂, 7♀♀. Mexico, Nueva Leon—Hacienda Vista Hermosa, Villa Santiago, elev. 1,500 feet, June 16, 1940, Hoogstraal and Knight, 3♂♂.

Chimarra laguna Ross, new species

This species belongs to the subgenus *Curgia* Walker and is a close relative of *C. betteni* Denning. From this species *C. laguna* differs in lacking paired projections near the dorsum of the eighth tergite, and in place of these having a single median projection. The tenth tergite and claspers also differ markedly in the two species.

Male. Length 9 mm. Color mostly black, the wings with patches of silvery hair as follows: a large one near base, two small ones near middle and a large one under the stigma and extending to M_{3+4}; legs beyond femora reddish brown. General structure typical for subgenus.

Genitalia as in figure 2. Eighth tergite, figure 2A, large, declivous posteriorly, and ending in a long sharp median spine; from beneath the base of this spine a partially sclerotized median ridge curves down to articulate with the top of the ninth tergite; the posterolateral corners of the eighth tergite are each produced into a large irregular flaplike projection bearing a cushion of long hair at its base and a row of stout macrochaetae along its posterior margin. Eighth sternite narrow and without ventral projections. Ninth segment, figure 2B, with dorsum produced into a narrow sinuate process articulating with eighth tergite, and with ventral

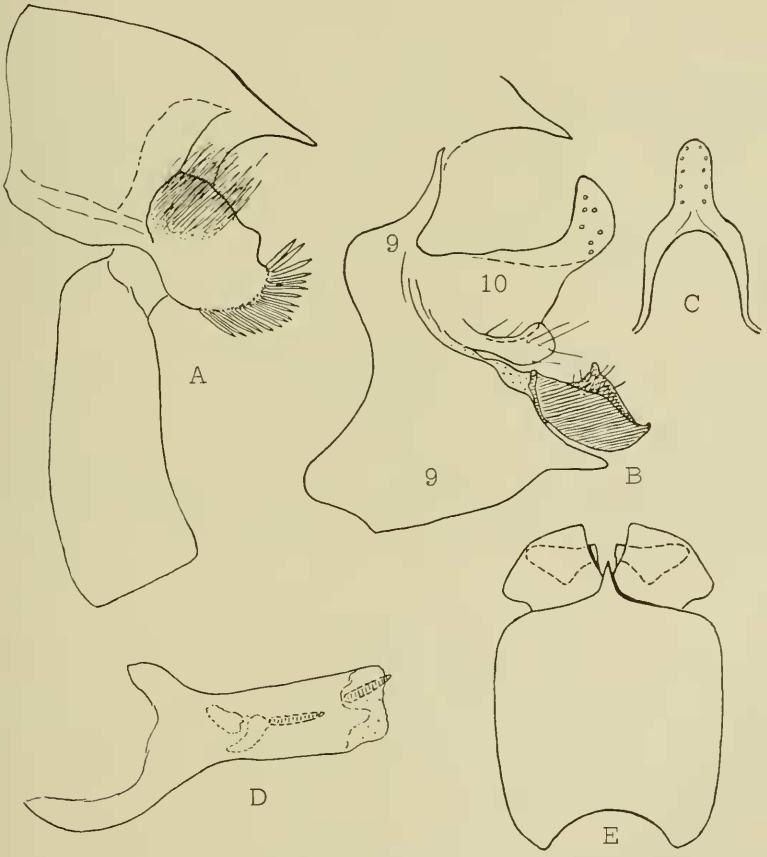

Fig. 2. *Chimarra laguna*, new species; *A*, eighth segment of male, lateral aspect; *B*, male genitalia, lateral aspect; *C*, tenth tergite, posterior aspect; *D*, aedeagus, lateral aspect; *E*, ninth sternite and claspers, ventral aspect.

portion large and bearing a posteromesal projection which lies beneath and between the bases of the claspers, figure 2E. Tenth tergite bulbous at base, upturned and forming a blunt, fleshy projection. Cercus short, curved, and enlarged at apex. Clasper short, somewhat rectangular from lateral view, heavily sclerotized. Aedeagus, figure 2D, with apex tubular and bearing two stout sclerotized internal rods.

Holotype, male. **Agua Caliente, Cape Region, Lower California, Mexico,** Oct. 18, 1941, Ross and Bohart. In the California Academy of Sciences.

Allotype, female. Las Animas, Sierra Laguna, Lower California, Mexico, Oct. 12, 1941, Ross and Bohart. Deposited with the holotype.

Paratypes. Same data as for holotype, 3 ♂ ♂. Same data as for allotype, 1 ♂. Two paratypes deposited with the holotype, two in the collection of the Illinois Natural History Survey.

Chimarra sp.

A few unassociated females, close to *C. angustipennis,* are left unidentified pending the collection of additional material from the following localities where the specimens were collected as indicated: Las Animas, Sierra Laguna, Nov. 12, 1941, Ross and Bohart, 3 ♀ ♀ ; Las Animas, Sierra Laguna, Nov. 16, 1941, Ross and Bohart, 1 ♀ ; and 5 miles south of Miraflores, July 10, 1938, Michelbacher and Ross, 1 ♀.

Family **PSYCHOMYIIDAE**

Tinodes sp.

Only females were collected, and in this genus good distinguishing characters have not yet been found for this sex. The data for the three specimens taken are: 17 miles S. of Ensenada, June 14, 1938, Michelbacher and Ross, 2 ♀ ♀ ; and 2 miles S. W. Msn. San Vicente, Nov. 20, 1941, Ross and Bohart, 1 ♀.

Family **HYDROPSYCHIDAE**

Smicridea sp.

A single female of this abundant southwestern genus is represented in the collection. This specimen was taken 17 miles S. Ensenada; June 14, 1938, Michelbacher and Ross.

Hydropsyche philo Ross

Hydropsyche philo Ross, 1941, Trans. Am. Ent. Soc., 67:90. Ross, 1944, Ill. Nat. Hist. Surv. Bull., 23:294.

Type locality: Monterey Co., Calif.

Recorded distribution: Monterey Co., Calif.

New records: LOWER CALIFORNIA—17 miles S. Ensenada, June 14, 1938, Michelbacher and Ross, 3♂♂, 4♀♀; 2 miles S. W. Mission San Vicente, Sept. 20, 1941, Ross and Bohart, 2♀♀. CALIFORNIA—Waddell Cr., Santa Cruz Co., Aug. 12, 1933, 2♀♀; Guatay, July 22, 1941, R. H. Beamer, 2♀♀, 8 miles E. of Santa Ana, May, 1944, J. E. Davis, 1♂.

Cheumatopsyche mickeli Denning

Cheumatopsyche mickeli DENNING, 1942, Can. Ent., 74:50. Ross, 1944, Ill. Nat. Hist. Surv. Bull., 23:294.

Type locality: Morgan Hill, Santa Clara Co., Calif.

Recorded distribution: Morgan Hill, Santa Clara Co., Calif.

New records: LOWER CALIFORNIA—17 miles S. Ensenada, June 14, 1938, Michelbacher and Ross, 2♂♂. CALIFORNIA—Adobe Cr., Stanislaus Co., 12 miles W. of Patterson, May 23, 1948, Hugh B. Leech, 1 pupa; Marysville, July, 1947, C. O. Mohr, 1♂; Kern River powerhouse No. 3, Road's End, Sept. 25, 1940, Kaloostian and Simmons, ♂♂, ♀♀.

FAMILY **ODONTOCERIDAE**

Only the genus *Marilia* is represented in the Lower California collections.

Marilia flexuosa Ulmer

Marilia flexuosa ULMER, 1905, Naturhist. Hofmus. Wien. Ann., 20:70. BETTEN, 1934, N. Y. St. Mus. Bull., 292:242. Ross, 1944, Ill. Nat. Hist. Surv. Bull., 23:300.

Anisocentropus fuscus BANKS, 1905[1], Trans. Am. Ent. Soc., 32:19.

Type locality: TEXAS. This species was originally described from 1♀ from Texas and 1♀ from Santa Catharina. I am hereby designating Texas as the restricted lectotype locality.

Recorded distribution: Texas, Brazil, and Arizona.[1]

New records: LOWER CALIFORNIA—Comondu, July 22, 1938, Michelbacher and Ross, 5♂♂, 1♀; 15 miles N. San Ignacio, Sept. 29, 1941, Ross and Bohart, 2♂♂, 1♀; 5 miles W. San Bartolo, July 13, 1938, Michelbacher and Ross, 1♂.

Marilia nobsca Milne

Marilia nobsca MILNE, Studies N. Am. Trich., 3:79. Ross, 1944, Ill. Nat. Hist. Surv. Bull., 23:300.

Type locality: Fort Davis, Jeff Davis Co., Tex.

Recorded distribution: Type locality.

New records: Lower California—Comondu, July 22, 1938, Michelbacher and Ross, 1♂; 20 miles N. Comondu, July 23, 1938, Michelbacher and Ross, 1♂; 5 miles S. Miraflores, July 10, 1938, Michelbacher and Ross, 1♂; 5 miles W. San Bartolo, July 13, 1938, Michelbacher and Ross, 2♂♂, 2♀♀; San Ignacio, June 26, 1938, Michelbacher and Ross, 1♂, 1♀; 5 miles S. San Miguel, July 20, 1938, Michelbacher and Ross, 1♂.

Family **CALAMOCERATIDAE**

Notiomyia sagittosa Ross, new species

This species is closely related to both *N. mexicana* Banks and *N. ornata* Banks, from both of which it differs in its uniform drab color pattern. The male genitalia of all three species are strikingly similar in general outline; in details those of *N. sagittosa* differ from those of *N. mexicana* in lacking a horn-like development of the tenth tergite and from those of *N. ornata* in lacking wide lateral flanges on the tenth tergite.

Male. Length 9 mm.; antennae very long, attaining about 15 mm. Color a mixture of light orange and dark brown as follows: head mostly orange with dark areas mesad of eyes, palps and antennae dark brown, nearly black; thorax orange; meso- and metathorax brown; abdomen dusky orange; legs light brown, the two posterior pair darker and clothed beyond femora with dense black hair; wings dark brown, with indistinct stripes of silvery hairs along the base of M, Cu_2, and 1A. General structure typical for genus.

Genitalia as in figure 3. Ninth segment almost annular. Tenth tergite, figure 3B, with a sharp shoulder where it connects with ninth, below that

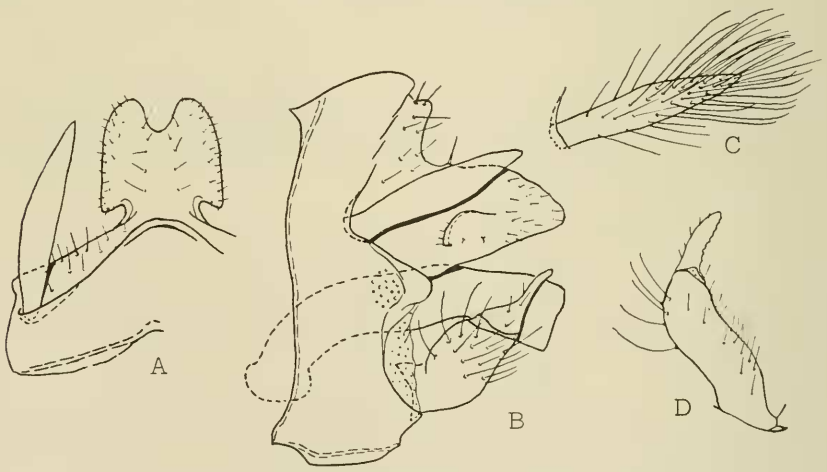

Fig. 3. *Notiomyia sagittosa*, new species; *A*, male genitalia, dorsal aspect; *B*, same, lateral aspect; *C*, cercus with normal setation; *D*, clasper, posterior aspect.

sloping into the large, deep apical portion. The dorsal aspect of this apical portion is excavated at apex and sharply constricted at base so that the extreme lateral margins form a flange, figure 3A. Cercus lanceolate, closed with abundant, long setae, figure 3C (the setae are omitted in figures 3A and 3B). Clasper, figure 3D, with distinct apical segment; basal segment sinuate and clothed with long lateral and short mesal setae; apical segment with lateral aspect bulbous at base, finger-like at apex, ventral aspect regular and with a serrate mesal margin. Aedeagus simple and tubular.

Holotype, male. **Todos Santos, Lower California, Mexico,** Nov. 10, 1941, Ross and Bohart. In the California Academy of Sciences.

Paratypes. Same data as for holotype, 3♂♂. Two deposited with the holotype and one in the collection of the Illinois Natural History Survey.

Family **LEPTOCERIDAE**

Oecetis inconspicua (Walker)

Leptocerus inconspicuus Walker, 1852, Cat. Neur. Brit. Mus., :71.

Setodes flaveolata Hagen, 1861, Syn. Neur. N. Am., :282.

Setodes micans Hagen, 1861, Syn. Neur. N. Am., :283.

Setodes sagitta Hagen, 1861, Syn. Neur. N. Am., :284.

Oecetina parvula Banks, 1899, Trans. Am. Ent. Soc., 25:215.

Oecetina flavida Banks, 1899, Trans. Am. Ent. Soc., 25:216.

Oecetina floridana Banks, 1899, Trans. Am. Ent. Soc., 25:216.

Oecetina inornata Banks, 1907, Proc. Ent. Soc. Wash., 8:128.

Oecetina apicalis Banks, 1907, Proc. Ent. Soc. Wash., 8:129.

Leptocerus incertus Hagen *nec* Walker, 1861, Syn. Neur. N. Am., :278.

Oecetis incerta (Hagen *nec* Walker). Betten, 1934[1], N. Y. St. Mus. Bull., 292:271.

Oecetis inconspicua (Walker). Milne, 1935, Stud. N. Am. Trich., 2: unnumbered page of corrections; Betten and Mosely, 1940[2], Fr. Walker Types Trich., :67; Ross, 1944[3], Ill. Nat. Hist. Surv. Bull., 23:242; Denning, 1947[4], Ann. Ent. Soc. Am., 40:656; Leonard and Leonard, 1949, Occ. Pap. Mus. Zool., Univ. Mich., 522:24.

Type locality: Georgia.

Recorded distribution: Widespread over North America from central Canada to Mexico[3], and in West Indies[4].

New records: Lower California—Comondu, July 22, 1938, Michelbacher and Ross, 1♀.

1,2 Extensive summaries to the literature are given in these papers.

Oecetis disjuncta (Banks)

Oecetina disjuncta BANKS, 1920, Bull. Mus. Comp. Zool., 64:351.

Oecetis disjuncta (BANKS). BETTEN, 1934, N. Y. St. Mus. Bull., 292:274; MILNE, 1935, St. N. Am. Trich., 1:17; Ross, 1938, Psyche, 45:24; Ross, 1944[1], Ill. Nat. Hist., Surv. Bull., 23:301.

Type locality: Arroyo Seco Canyon, San Gabriel Mts., Calif.

Recorded distribution: Western United States[1].

New records: LOWER CALIFORNIA—Rio Santo Domingo, Rancho San Antonio, 1,000 feet elev., May 24, 1937, H. J. Rayner, 2♂♂.

Leptocella sp.

A single male of this genus is in the collection. It belongs to the *L. texana* complex, but there is so much uncertainty regarding the identity of material in this portion of the genus that it seems advisable to refrain from placing a specific identification on the specimen. It was collected 5 miles S. Miraflores, July 10, 1938, Michelbacher and Ross.

FAMILY SERICOSTOMATIDAE

Sericostoma sp.

In Lower California several specimens were obtained belonging to the *S. griseolum* group. Further study is needed in this group before the various species segregates can be ascertained and the existing names applied to them. The data are as follows: Catavina, July 19, 1938, Michelbacher and Ross, 2♂♂; 17 miles S. Ensenada, June 14, 1938, Michelbacher and Ross, 8♀♀.

FAMILY HELICOPSYCHIDAE

Helicopsyche borealis (Hagen)

Notidobia borealis HAGEN, 1861, Syn. Neur. N. A., :271.

Helicopsyche californica BANKS, 1899, Trans. Am. Ent. Soc., 25:210.

Helicopsyche annulicornis BANKS, 1904, Proc. Ent. Soc. Wash., 6:212.

Helicopsyche borealis (HAGEN). BETTEN, 1934[1], N. Y. St. Mus. Bull., 292:417; MILNE, 1936, Studies N. Am. Trich., 3:115; Ross, 1938, Psyche, 45:42; Ross, 1944[2], Ill., Nat. Hist. Surv. Bull., 23:266, 288; LEONARD and LEONARD, 1949[3], Occ. Pap. Mus. Zool., Univ. Mich., 522:28.

Helicopsyche californicus BANKS. Ross, 1938, Psyche, 45:42.

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[1] Contains extensive bibliography.

Type locality: St. Lawrence River, Canada.

Recorded distribution: Widely distributed over North America[1,2,3].

New records: Rio Santo Domingo, Rancho San Antonio, 1,000 feet elev., May 24, 1937, H. J. Rayner, 1 ♂.

Helicopsyche sp.

Three collections of this genus consist of a single female each. Specific characters are not yet established for the identification of this sex, so no further identification can be made at this time. The collections were made 17 miles S. of Ensenada, June 14, 1938, Michelbacher and Ross; at San Fernando, July 31, 1938, Michelbacher and Ross; and at Todos Santos, Nov. 10, 1941, Bohart and Ross.

FAMILY **LEPIDOSTOMATIDAE**

Lepidostoma rhino Ross

Lepidostoma rhino Ross, 1946, Ann. Ent. Soc. Amer., 39:276.

Type locality: R. Santo Domingo, Rancho San Antonio, Lower California.

No additional material of this species has been collected.